

WML- C40 User Manual

The purpose of this manual is to explain correct way how to integrate module WML-C40 to the end product. It includes procedures that shall assist you to avoid unforeseen problems.

This manual presents information that shows how module and OEM product, where module integrated, complies with regulations in certain regions. Any modifications, not expressly approved by the manufacturer could void the authority to operate in these regions.

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1. General

This Bluetooth radio module has to be installed and used in accordance with the technical description/installation instructions provided by the manufacturer.

This Bluetooth radio module is intended to be placed on the market in all States, where the Bluetooth™ technology and the used frequency band is released.

For detail information concerning type approval of this module (e.g. where this module is already pre-approved) please contact the manufacturer.

The system may only be implemented in the configuration that was authorized.

Note that any changes or modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

2. DESCRIPTION.

2.1 HVIN and PMN

HVIN : WML-C40

PMN : WML-C40AH, WML-C40AB, WML-C40AS

2.2 Hardware: Version 1

This document describes the reference design for application as follows.

2.3 FEATURES

- Bluetooth Ver2.1 + EDR
- Host Interface : UART
- Frequency: 2402-2480MHz (World Wide)
- RF Channel band: 1MHz
RF Channel number: 79ch
- Data Rate: GFSK 1Mbps, $\pi/4$ -DQPSK 2Mbps, 8DPSK 3Mbps
- Output Power: 12 dBm(MAX) Sensitivity: -82dBm
- Supply Voltage: 3.3V \pm 0.1V
- Current Consumption
Tx: 120mA(MAX), Rx: 70mA(MAX)
- Operating temperature: -40 to +70 degree C
- Module size: 13.2mm x 24.8mm x 2.05mm

2.4 APPLICATIONS

Notebook PCs, mobile phones, digital cameras, PC peripherals, PDA, Car.

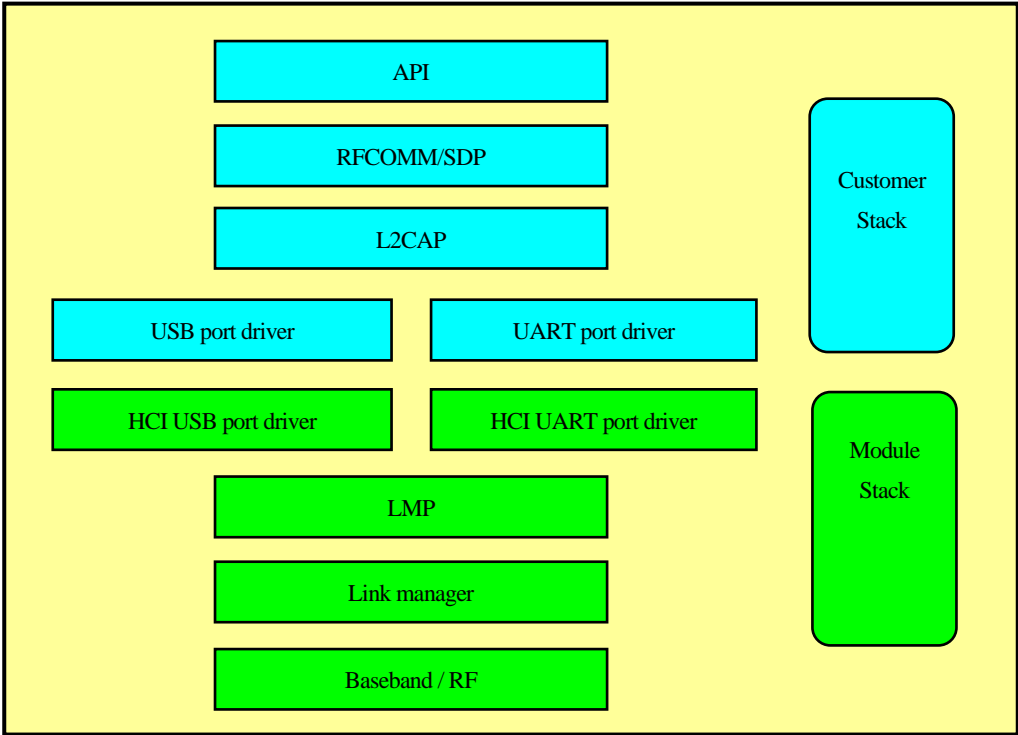
2.5 ARCHITECTONICS

WML-C40 has Bluetooth chip, Flash ROM and Crystal inside.

UART HCI interface and PCM interface are used for customer's application.

Following figure shows Software Stack for WML-C40 and customer's application as example.

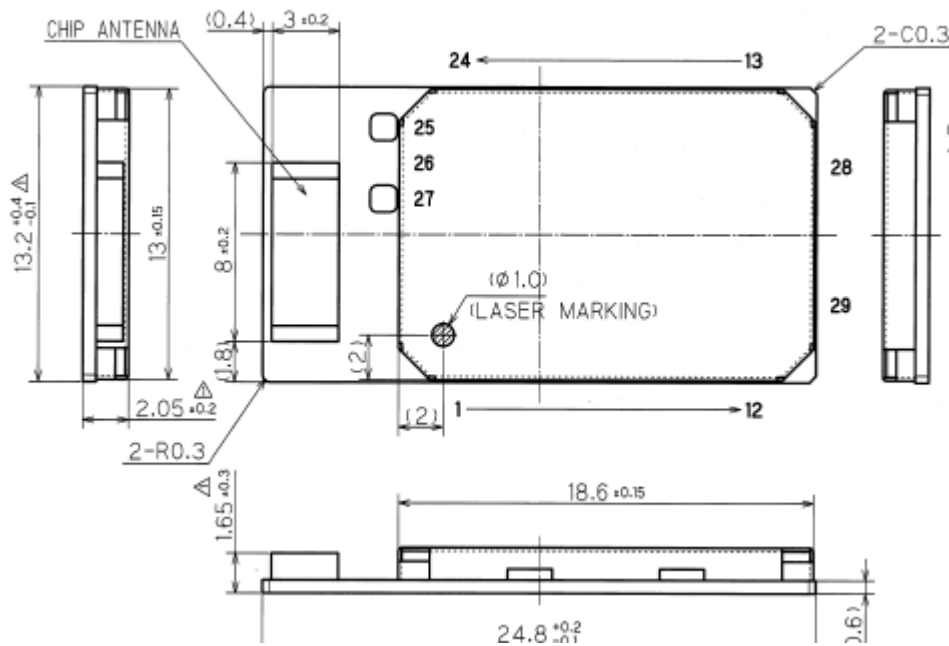
2.6 SOFTWARE LAYERS



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2.7 DIMENSIONS



No.	TERMINALS	No.	TERMINALS
1	GND	16	UART_CTS
2	SPI_MOSI	17	USB_D+
3	PIO [6]	18	USB_D-
4	PIO [7]	19	PIO [2] / USB_PULL_UP
5	RESET	20	PIO [3] / USB_RESUME
6	SPI_CLK	21	PIO [5]
7	PCM_CLK	22	PIO [4]
8	PCM_SYNC	23	SPI_CSB
9	PCM_IN	24	SPI_MISO
10	PCM_OUT	25	GND
11	VDD	26	N.C.(RF_TEST:ANT)
12	GND	27	GND
13	UART_RX	28	GND
14	UART_TX	29	GND
15	UART_RTS		

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2.8 Spec

•Transmission/Reception Frequencies : unit [MHz]

GFSK 1Mbps, $\pi/4$ -DQPSK 2Mbps, 8DPSK 3Mbps

ch	Freq.	ch	Freq.
1	2402	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2453
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480
20	2442		

• Transmission power (at each antenna connector): unit [dBm] TYP.

GFSK 1Mbps, $\pi/4$ -DQPSK 2Mbps, 8DPSK 3Mbps

ch	Freq.	1Mbps	2Mbps	3Mbps	ch	Freq.	1Mbps	2Mbps	3Mbps
1	2402	9	8	8	21	2444	9	8	8
2	2406	9	8	8	22	2446	9	8	8
3	2408	9	8	8	23	2448	9	8	8
4	2410	9	8	8	24	2450	9	8	8
5	2412	9	8	8	25	2453	9	8	8
6	2414	9	8	8	26	2454	9	8	8
7	2416	9	8	8	27	2456	9	8	8
8	2418	9	8	8	28	2458	9	8	8
9	2420	9	8	8	29	2460	9	8	8
10	2422	9	8	8	30	2462	9	8	8
11	2424	9	8	8	31	2464	9	8	8
12	2426	9	8	8	32	2466	9	8	8
13	2428	9	8	8	33	2468	9	8	8
14	2430	9	8	8	34	2470	9	8	8
15	2432	9	8	8	35	2472	9	8	8
16	2434	9	8	8	36	2474	9	8	8
17	2436	9	8	8	37	2476	9	8	8
18	2438	9	8	8	38	2478	9	8	8
19	2440	9	8	8	39	2480	9	8	8
20	2442	9	8	8					

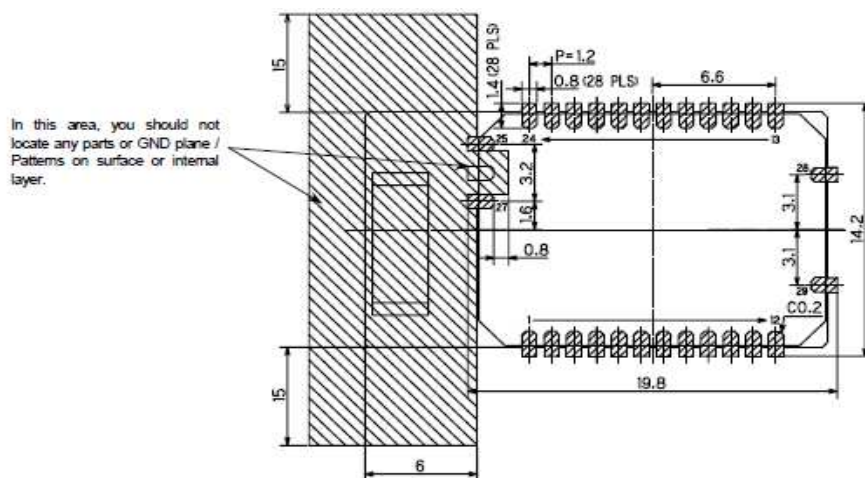
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- **Receive Sensitivity:** unit [dBm] TYP.
GFSK 1Mbps, $\pi/4$ -DQPSK 2Mbps, 8DPSK 3Mbps

Band	Data rate		Max	Min	Unit	BER
2402MHz	1	Mbps	-20	-72	dBm	0.1 %
-	2	Mbps	-20	-70	dBm	0.01 %
2480MHz	3	Mbps	-20	-70	dBm	0.01 %

2.9 Note in terms of designing



1. Please don't place any solid GND and line on below blue line's area. (with the exception of SMT land for this module.)
2. Because red line's area is the antenna, it should be put on your PCB material.
3. Please don't place any GND and line to the upper/lower side of the antenna.
4. If you can, please don't place any metal parts around 15mm from antenna.(indicated by green line's area)
5. Because 2.4GHz is affected of the water, please have distance between the antenna(red line's area) and the human body as possible as
6. On your system, please don't use metal for cover of this evaluation board.

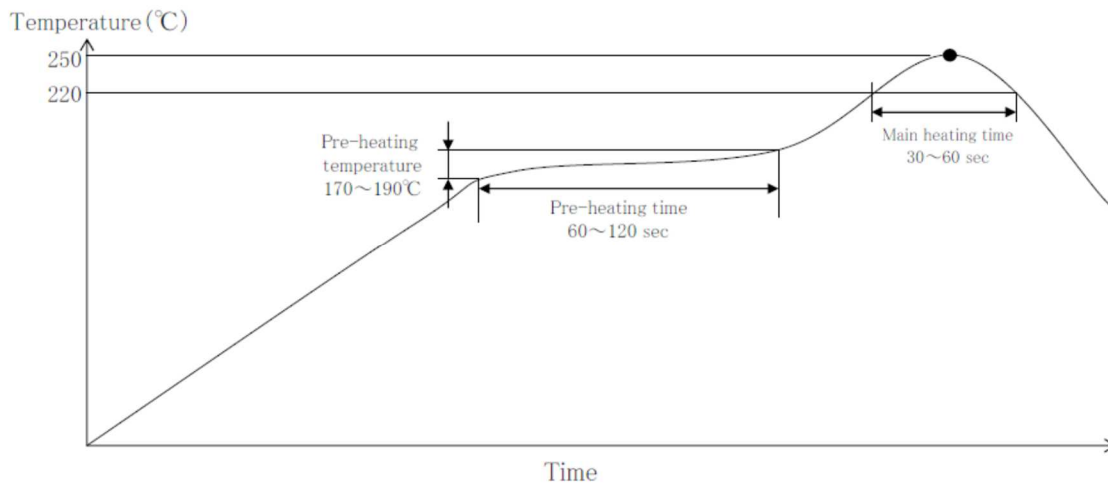
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2.10 Recommended Reflow Condition

- 1) Pre heat : 170 → 190 degree 60 ~ 120sec
- 2) Peak Temperature : MAX 250 degree
: 220 degree 30 ~ 60 sec
- 3) Reflow number of times : MAX 1 time

Recommended Reflow Profile



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3. FCC Regulatory Information

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment has very low levels of RF energy that is deemed to comply without testing of specific absorption rate(SAR).

Labelling.

MITSUMI module WML-C40 labelled as below.

FCC ID : EW4-WC40

FCC Regulatory information. OEM devise should contain labelling that:

Approved in accordance to FCC rules transmitter module marked by FCC-ID:EW4-WC40 label, manufactured by MITSUMI incorporated to OEM product. When its not possible, in user manual should be included such information.

This equipment should be installed and operated with minimum distance 10mm between the radiator & your body.

4.Canada, Industrie Canada (IC)

The following information must be indicated on the host device of this module;

Model Name : WML-C40

Contains IC: 4250A-WC40

The following statements must be described on the user manual of the host device of this module;

This device complies with Industry Canada's applicable licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) l'appareil ne doit pas produire de brouillage;
- 2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment has very low levels of RF energy that is deemed to comply without testing of specific absorption rate (SAR).

Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles des radioélectriques (RF) de la FCC lignes directrices d'exposition et d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement émet une énergie RF très faible qui est considérée comme conforme sans évaluation du débit d'absorption spécifique (DAS).

This equipment should be installed and operated with minimum distance 20mm between the radiator & your body.

Cet appareil doit être installé et utilisé avec une distance minimale de 20 mm entre le radiateur et le corps humain.

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